

Ethanolamines in the Personal Care Industry

DESCRIPTION

Monoethanolamine (MEA), diethanolamine (DEA), and triethanolamine (TEA), are high-boiling, colorless liquids that are viscous at room temperature. These ethanolamines are bifunctional allowing for wide spread use in the chemical industry as components in detergents, pharmaceuticals, and cosmetics. Ethanolamines are commonly used as neutralizing agents for fatty acids and sulfonated surfactants used in cosmetics. Ethanolamines are hydrophilic and miscible with water and most alcohols making them ideal for use as surfactants, either alone or esterified. Ethanolamines are produced by the reaction of ethylene oxide (EO) with ammonia which primarily produces MEA. However, since EO is highly reactive, the additional secondary products of DEA and TEA are produced.

APPLICATIONS

In the personal care market, ethanolamines and ethanolamine derivatives are most frequently used in:

- bubble baths
- hand and body lotions
- cleansing or shaving creams or gels
- cosmetic or facial creams
- liquid body wash
- shampoos
- waterless hand cleaners

Physical Properties ^A	MEA ^B	DEA ^B	TEA ^B
CAS #	141-43-5	111-42-2	102-71-6
EINCS	205-483-3	203-868-0	203-49-8
Molecular Weight	61.08	105.14	149.19
Specific Gravity @ 20/20°C	1.018	1.0919	1.126 ^C
Freezing Point, °C(°F)	10.3 (50.5)	28.0(82.4)	21.6(70.9) ^D
Flash Point (COC), °C(°F)	91.0(195.8)	166(330)	210(410) ^E
Vapor Pressure @20°C mm Hg	0.68	<0.01	<0.001
Viscosity, @20°C, cP	24	crystalline	crystalline
Viscosity, @30°C, cP		387	404
Coefficient of Expansion @55°C, per °C	0.00079	0.00060	0.00055
Weight/gal. (US) in lbs. at 25°C	8.47	9.09	9.39

- A. These are typical properties and should not be construed as sales specifications.
 B. Properties provide are based on the 99% grade.
 C. Supercooled liquid
 D. Easily supercools
 E. Pensky Martens Closed Cup

APPLICATION DATA

Monoethanolamine (MEA)

MEA is a colorless, hygroscopic and moderately viscous liquid with a mild ammoniacal odor. It is a primary amine with a high pH. It is often used as a chemical intermediate in the manufacture of cosmetics, surface-active agents, and emulsifiers as well as in antibiotics and pharmaceuticals. Two grades are available: MEA-99 and MEA Low Freeze (LF).

<i>Sales Specification*</i>	MEA-99%	MEA-LF ¹
• Purity, MEA wt.%, min.....	99.5	83.0
• DEA, wt.%, max	0.1	0.5
• Color (APHA), max	15.....	25
• Apparent EQ. Wt.....	61.0-62.0.....	not applicable
• Water, wt.% max.....	0.3	14.0 to 16.0

1. Analyses of Low Freeze material were performed prior to the addition of water.

Diethanolamine (DEA)

DEA is a clear, hygroscopic liquid with a mild ammoniacal odor above room temperature. At room temperature it is a white crystalline solid. DEA is used as an intermediate in the manufacture of cosmetics, and as a surface-active agent. DEA is commonly reacted with fats, oils or derived fatty acids to form amides which are used as foam stabilizers, emulsifiers and viscosity builders in personal care products such as shampoos, cosmetics and dishwashing liquids. DEA is offered in two grades: DEA - 99 and DEA Low Freeze (LF).

<i>Sales Specification*</i>	DEA-99%	DEA-LF
• Purity, DEA wt.%, min	98.5	83.5
• MEA, wt.%, max.....	1.0	0.9
• TEA, wt.%, max.....	1.0	0.9
• Color (APHA), max	15.....	25
• Apparent EQ. Wt.....	104-106.....	N/A
• Water, wt.% max.....	15.5	

1. Analyses of Low Freeze material were performed prior to the addition of water.

Triethanolamine (TEA)

TEA is a viscous organic base with a mild ammoniacal odor. It is used as an intermediate in the manufacture of surfactants and in personal care products. TEA, a tertiary amine often reacted with acidic compounds to form salts, is offered in one grade, TEA-99

<i>Sales Specification*</i>	TEA-99%
• Purity, TEA wt.%, min.....	99.0
• DEA, wt.%, max	1.0
• Color (APHA), max	50
• Apparent EQ. Wt.....	145-150
• Water, wt.%, max.....	0.1

Visit us at our Web site: www.equistarchem.com

World Headquarters

Lyondell Chemical Company
One Houston Center
1221 McKinney Street, Suite 700
PO Box 2583
Houston, TX 77252-2583 USA
Telephone: (713) 652-7300

Telephone toll-free in the U.S. and Canada **1-888-777-0232** or e-mail personalcare@equistarchem.com

* To obtain the most recent and up to date specifications, please contact customer service at 1-888-777-0232